PATENT ABSTRACTS OF JAPAN

(11)Publication number : 05-234079
(43)Date of publication of application : 10.09.1993

(51)Int.Cl. G11B 7/00
G11B 7/125

(21)Application number : 04-034624
(22)Date of filing : 21.02.1992

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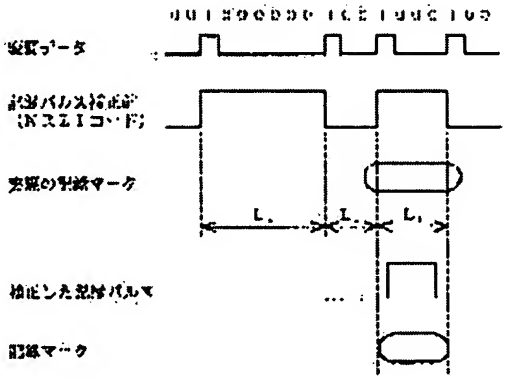
(54) METHOD FOR RECORDING MARK EDGE AND DEVICE THEREFOR

(57)Abstract:
PURPOSE: To exactly control the edge position of a recording mark even in the case the potional deviation of edges are different from each other by a recording data pattern.
CONSTITUTION: By irradiating an optical recording medium with laser beam modulated in intensity and forming a recording mark whose length bears information, the information is recorded. In this case, recording pulse length L0 of a write object, blank length L1 immediately before this recording pulse and recording pulse length L2 before by one are calculated, and in accordance with these length L0, L1 and L2, pulse width to the recording pulse of the write object and the correction value of an output timing are set, in accordance with the correction value, the edge position of the recording pulse of the write object is corrected and recorded.



LEGAL STATUS

[Date of request for examination]	26.10.1998
[Date of sending the examiner's decision of rejection]	
[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]	
[Date of final disposal for application]	
[Patent number]	3165216
[Date of registration]	02.03.2001
[Number of appeal against examiner's decision of rejection]	
[Date of requesting appeal against examiner's decision of rejection]	
[Date of extinction of right]	

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CLAIMS

[Claim(s)]
[Claim 1] In the mark edge record approach which recorded information by forming the record mark whose die length irradiate the laser beam which carried out intensity modulation on the optical recording medium, and bears information The record pulse duration L0 for writing, and blank length L1 in front of this record pulse And record pulse duration L2 in front of one It computes. Such die length L0, L1, and L2 The mark edge record approach characterized by responding, setting up the correction value of the pulse width and output timing to the record pulse for [said] writing, amending the edge location of the record pulse for writing according to this correction value, and making it record.
[Claim 2] In the mark edge record approach which recorded information by forming the record mark whose die length irradiate the laser beam which carried out intensity modulation on the optical recording medium, and bears information The record pulse duration L0 for writing, and blank length L1 in front of this record pulse And record pulse duration L2 in front of one It computes. Such die length L0, L1, and L2 Pulse width [as opposed to / respond and / the record pulse for / said / writing], The mark edge record approach characterized by setting up the correction value of the die length to which the record power and this record power of output timing and the record pulse standup section are changed, amending the edge location and mark configuration of a record pulse for writing according to this correction value, and making it record.
[Claim 3] The mark edge record approach according to claim 1 characterized by computing one or more blank length and record pulse duration who precede further in addition to the record pulse duration L0 for writing, the blank length L1 in front of a record pulse, and the record pulse duration L2 in front of one, and setting up correction value.
[Claim 4] In the mark edge recording device which recorded information by forming the record mark whose die length irradiate the laser beam which carried out intensity modulation on the optical recording medium, and bears information The record pulse duration L0 for writing, and blank length L1 in front of this record pulse And record pulse duration L2 in front of one A record data pattern discernment means to compute is established. Such die length L0, L1, and L2 A correction value setting means to respond and to set up the correction value of the pulse width and output timing to the record pulse for [said] writing is established. The mark edge recording device characterized by establishing a record pulse amendment means to amend the edge location of the record pulse for writing according to the correction value by this correction value setting means.
[Claim 5] The mark edge recording device according to claim 4 characterized by considering as a record data pattern discernment means to compute record pulse duration and blank length with a counter.
[Claim 6] The mark edge recording device according to claim 5 characterized by forming separately the counter which counts record pulse duration, and the counter which counts blank length.
[Claim 7] They are die length L0, L1, and L2 beforehand. Mark edge recording device according to claim 4, 5, or 6 characterized by considering as the correction value setting means which consists of a ROM which memorized the correction value of the record pulse according to information.
[Claim 8] They are [a distinction means to distinguish the class of optical recording medium and] die length L0, L1, and L2 beforehand. Mark edge recording device according to claim 4, 5, or 6 characterized by considering as the correction value setting means which consists of a selection means to choose two or more ROMs which memorized the correction value of the record pulse according to information for every class of optical recording medium, and ROM which corresponds according to the distinction result of said distinction means.
[Claim 9] Die length L0, L1, and L2 suitable for the class of optical recording medium distinguished from a distinction means to distinguish the class of optical recording medium Mark edge recording device according to claim 4, 5, or 6 characterized by considering as the correction value setting means which consists of RAM in which the correction value of the record pulse according to information is written, and a write-in control means for this RAM.
[Claim 10] The mark edge recording device according to claim 9 which considers as the optical recording medium which made the appointed field memorize the correction value of the record pulse suitable for that class, and is characterized by making it make the correction value of the record pulse read from this appointed field by the write-in control means write in RAM.
[Claim 11] A power up and the record front stirrup of data are a mark edge recording device according to claim 9 or 10 characterized by considering as the write-in control means to which the writing to RAM is made to carry out at the time of the idle state of equipment.
[Claim 12] The mark edge recording device according to claim 4 which carries out [having considered as the record pulse amendment means which consists of a delay means delay respectively the pulse which shows the front edge positional information and the back edge positional information of a record data pattern which have been recognized by the record data pattern recognition means based on the correction value of the record pulse by the correction-value setting means, and a generation means generate the record pulse in the NRZI code from the pulse train delayed with this delay means, and] as the description.
[Claim 13] A pulse train separation means to separate the pulse which shows the front edge positional information of the record data pattern recognized by the record data pattern recognition means, and the pulse which shows back edge positional information, A delay means to delay each separated pulse train respectively based on the correction value of the record pulse by the correction value setting means, The mark edge recording device according to claim 4 characterized by considering as the record pulse amendment means which consists of a generation means to generate the record pulse in the NRZI code from each pulse train delayed with this delay means.
[Claim 14] The mark edge recording device according to claim 12 characterized by considering as the generation means which consists of a

toggle mold flip-flop which repeats toggle actuation and generates the record pulse in the NRZI code whenever the pulse which shows the front edge positional information respectively delayed based on the correction value of a record pulse, and the pulse which shows back edge positional information are inputted.

[Claim 15] The mark edge recording device according to claim 13 characterized by to consider as the generation means which consists of the AND gate which considers the output of a ** generation means, and the generation means for before these and the generation means for after as an input after generating the NRZI code which amended only the pulse train which indicates back edge positional information to be the ** generation means before generating the NRZI code which amended only the pulse train which shows front edge positional information.

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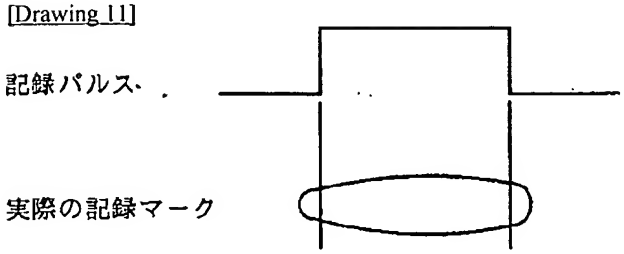
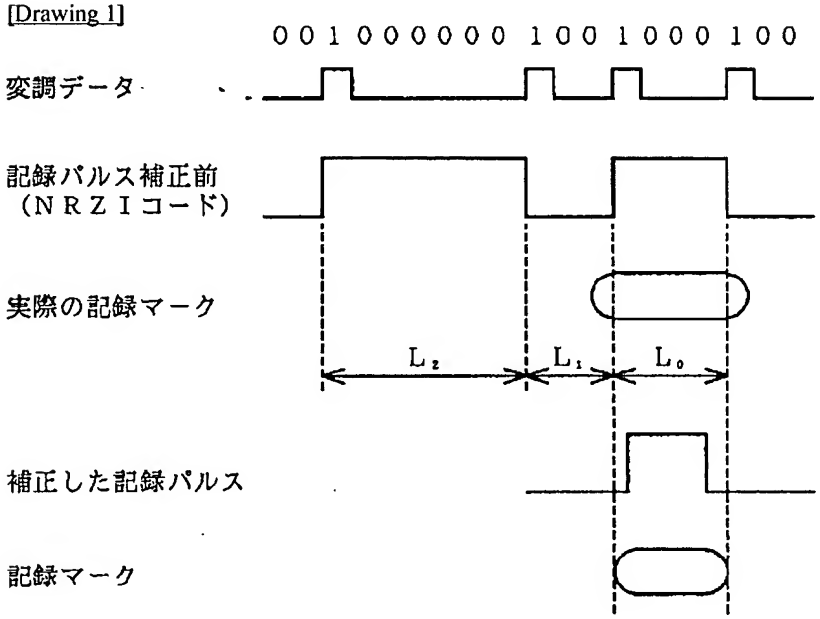
DRAWINGS

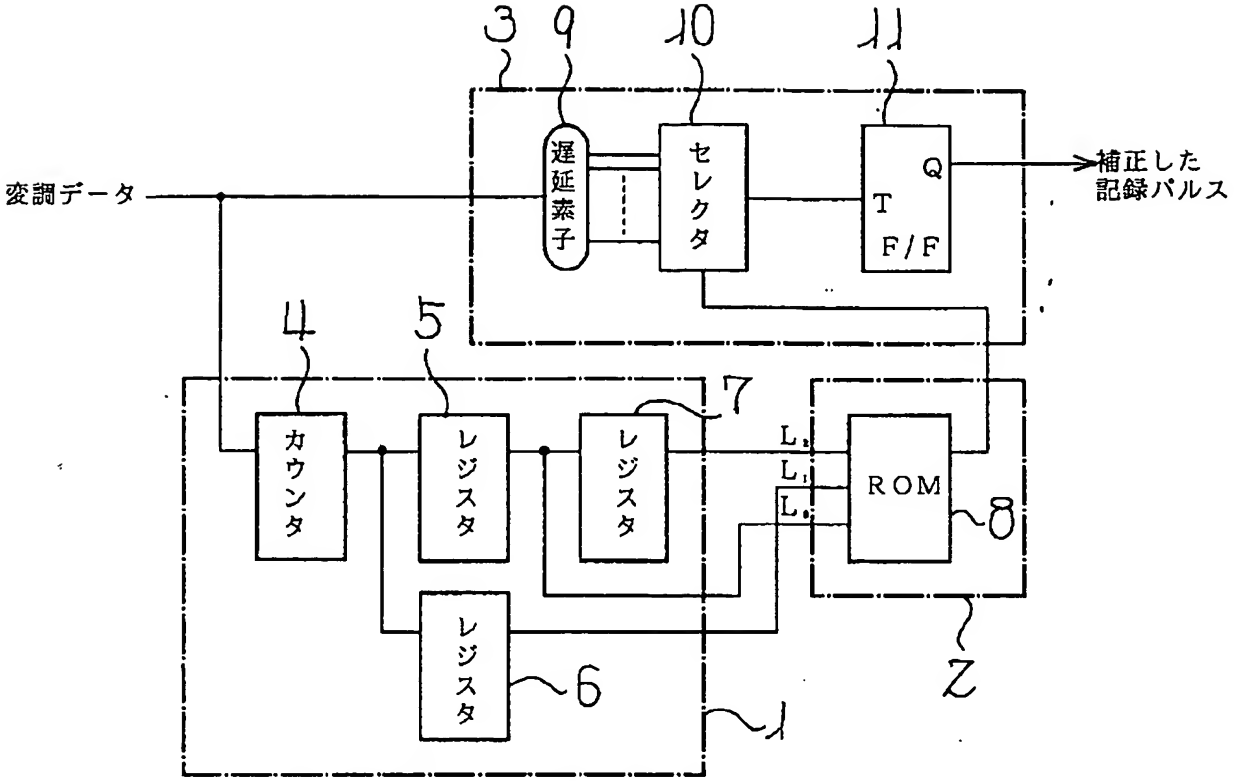
[Drawing 11]



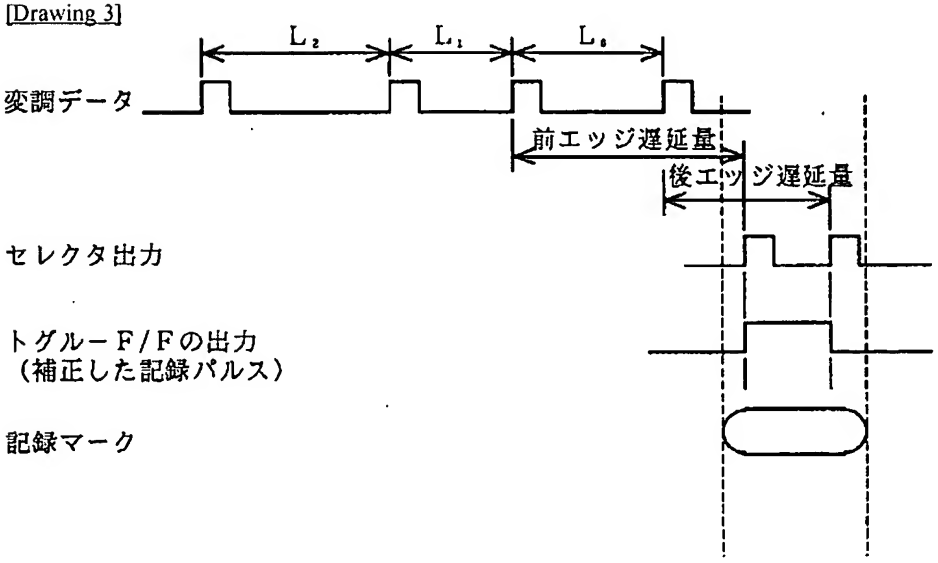
[Drawing 1]



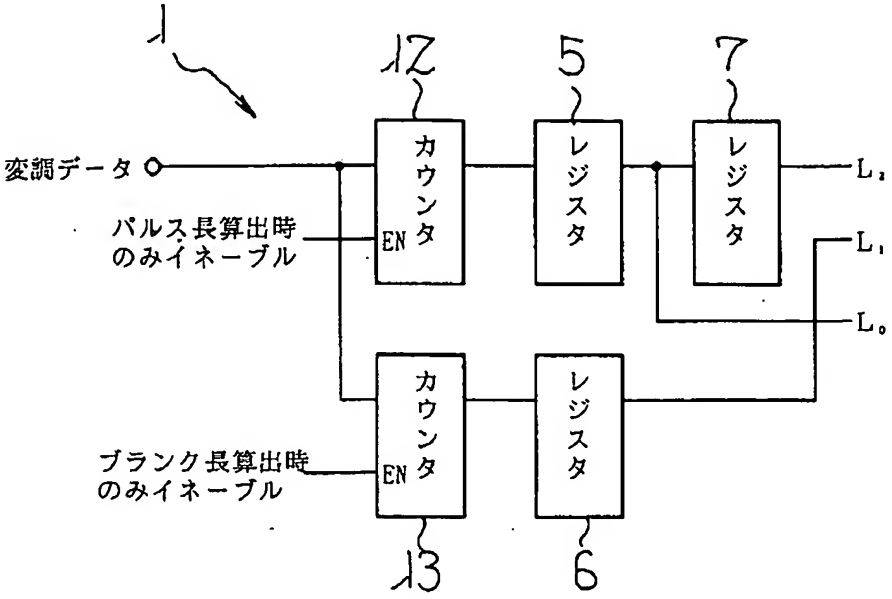
[Drawing 2]



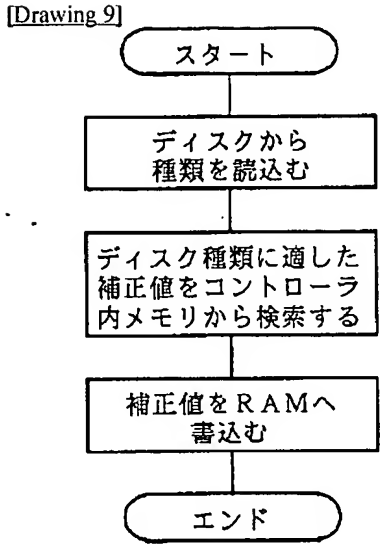
[Drawing 3]



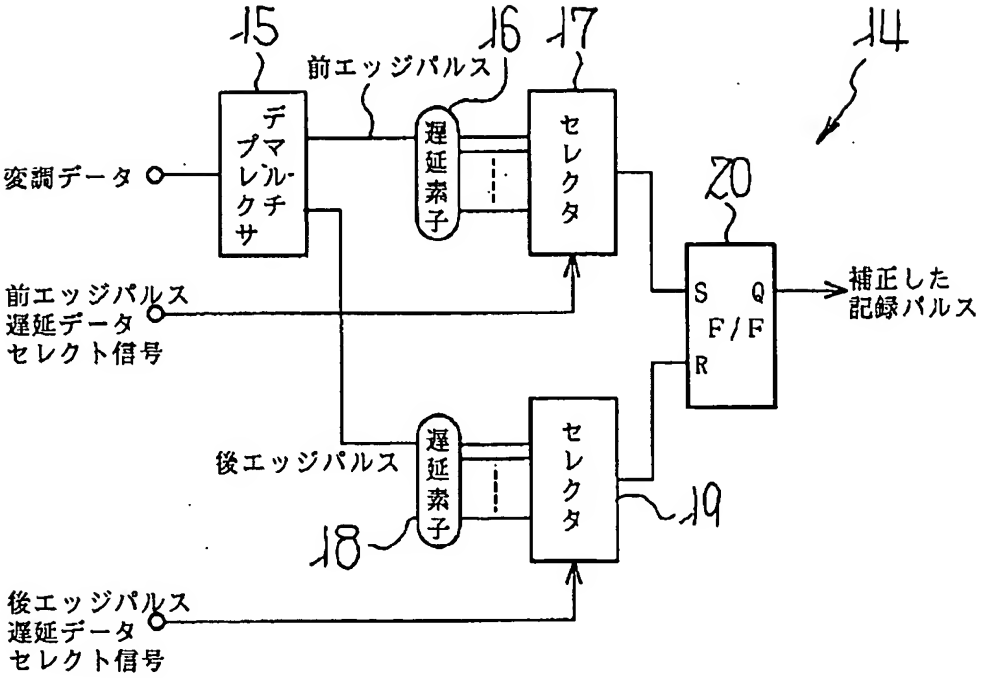
[Drawing 4]



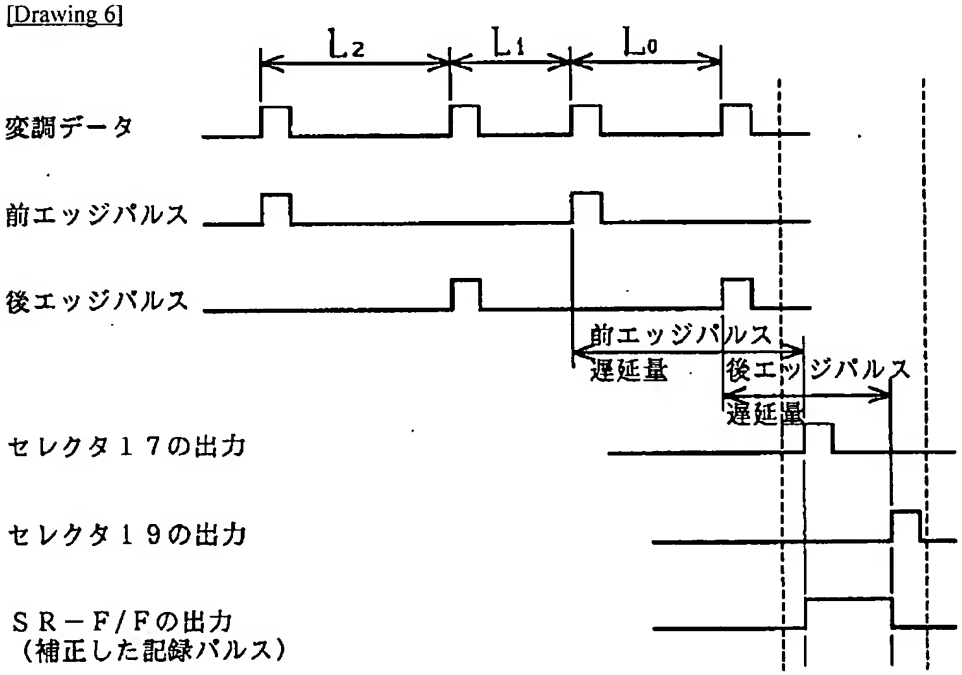
[Drawing 9]



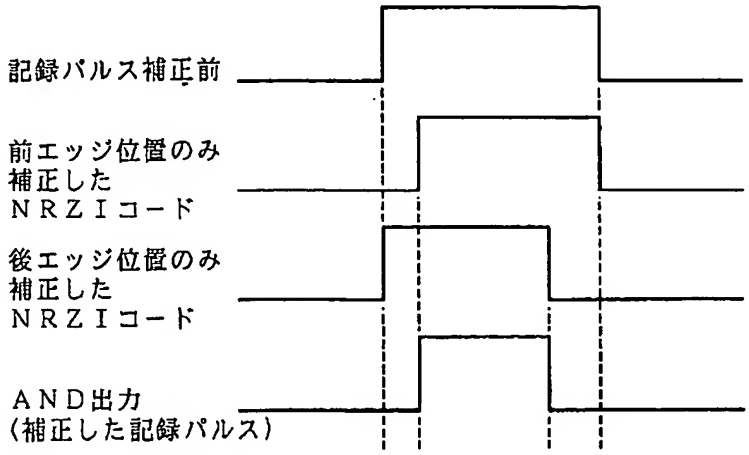
[Drawing 5]



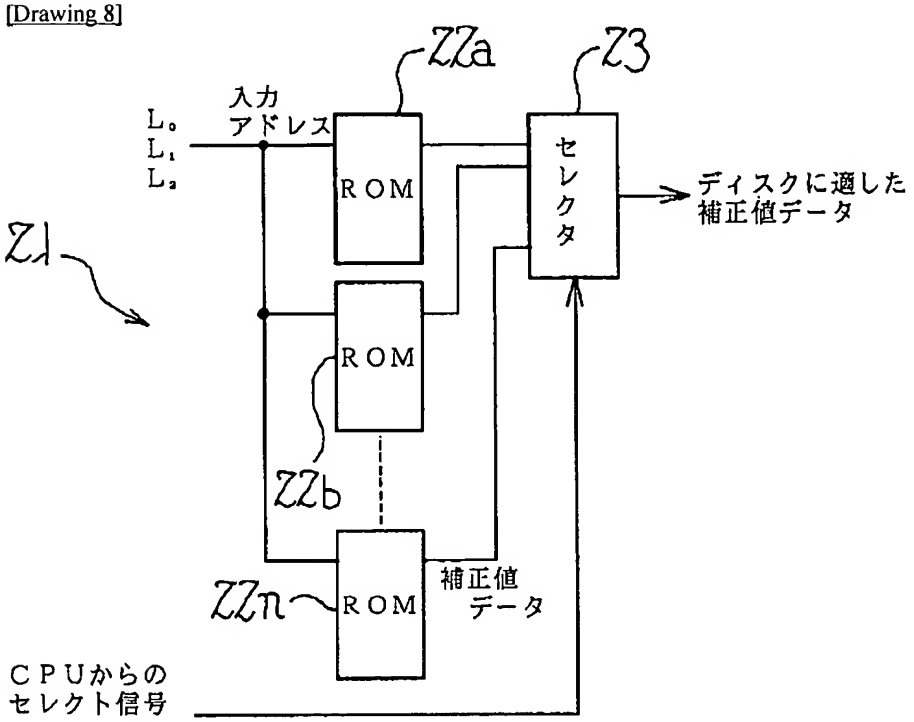
[Drawing 6]



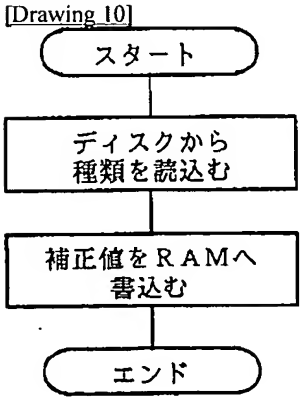
[Drawing 7]



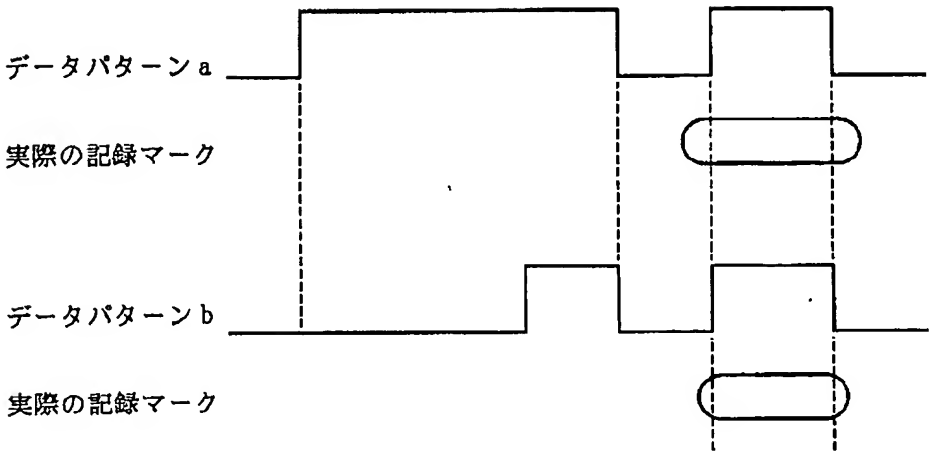
[Drawing 8]



[Drawing 10]



[Drawing 12]



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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to the mark edge record approach in optical disk drive equipment or Magnetic-Optical disk drive equipment, and its equipment.
[0002]
[Description of the Prior Art] When writing in data in an optical disk, he is trying to record data generally by irradiating a laser beam to up to an optical recording medium, applying heat, making a hole in a medium, making it reverse the magnetization direction of a medium, or changing the crystallized state of a medium to it.
[0003] Here, a symbolic-language bit is made to correspond to the front edge and back edge of a record mark respectively as one of the record approaches of an optical disk, and it is the "mark edge record approach" by which it was made for the die length of a record mark to bear information. While this record approach is suitable for high density record-ization, accuracy is required of an edge location.
[0004] That is, as it is shown in drawing 11 under the effect of the remaining heat of a record mark written in immediately before since are recording of the heat according to a laser beam near the front edge in becoming longer than the record pulse which actual record mark length impressed **** is inadequate in case it records by the mark edge record approach, it is irregular ********** of a mark configuration. An edge location shifts from the location of an ideal and JITA increases, and when the worst, it will become impossible for this reason, to reproduce as the original data. Therefore, in the mark edge record approach, exact edge position control is needed.
[0005] as the edge position control approach since it is such -- the pulse width and power of a record light pulse -- the record radius of an optical disk -- responding -- or the non-dense of a record data pattern -- what it was made to amend (that is, the previous blank length) more densely is shown by JP,63-53722,A.
[0006]
[Problem(s) to be Solved by the Invention] However, in case it records on a medium with high thermal conductivity like a magneto-optic disk, the location of the front edge of a record mark and a back edge will shift under the effect of the remaining heat of not only the effect of the heat of a record mark which it is going to write in but the record mark written in just before. That is, since the amounts of the remaining heat accumulated in the optical disk by the difference in blank length at the last mark length list differ, an edge location discrepancy changes with record data patterns. For example, since the amounts of the heat accumulated in the optical disk differ like a data pattern a and a data pattern b when preceding-record pulse duration differs even if blank length is equal as shown in drawing 12 , the amounts of location gaps of the edge of a record mark differ. Therefore, at the time of the record over a magneto-optic disk, like before, the pulse width of a record pulse and the amount of amendments of power cannot be set up uniformly, or exact edge position control cannot be performed by the approach of determining the amount of amendments only by the previous blank length.
[0007] Moreover, for the same reason as the above, also in case non-** of a mark configuration which was mentioned above is amended, since the degree of the heterogeneity of a mark configuration changes with record data patterns, the power of the standup section of a record pulse will be set up uniformly, or amendment of a mark configuration will become imperfect with a conventional method which is determined only by the previous blank length.
[0008]
[Means for Solving the Problem] In the mark edge record approach which recorded information by forming the record mark whose die length irradiate the laser beam which carried out intensity modulation on the optical recording medium in invention according to claim 1, and bears information The record pulse duration L0 for writing, and blank length L1 in front of this record pulse And record pulse duration L2 in front of one It computes. Such die length L0, L1, and L2 It responds, the correction value of the pulse width and output timing to the record pulse for [said] writing is set up, the edge location of the record pulse for writing is amended according to this correction value, and it was made to record.
[0009] The correction value of the die length to which the record power and this record power of the record pulse standup section other than pulse width and output timing to the record pulse for writing are changed is also set up, the edge location and mark configuration of a record pulse for writing are amended according to this correction value, and it was made to record in invention according to claim 2.
[0010] Moreover, in invention according to claim 3, in addition to the record pulse duration L0 for writing, the blank length L1 in front of a record pulse, and the record pulse duration L2 in front of one, one or more blank length and record pulse duration who precede further are computed, and correction value was set up.
[0011] As equipment for enforcing such a record approach, in invention according to claim 4 The record pulse duration L0 for writing, and blank length L1 in front of this record pulse And record pulse duration L2 in front of one A record data pattern discernment means to compute is established. Such die length L0, L1, and L2 A correction value setting means to respond and to set up the correction value of the pulse width and output timing to the record pulse for [said] writing is established. A record pulse amendment means to amend the edge location of the record pulse for writing according to the correction value by this correction value setting means was established.
[0012] By invention according to claim 5, it considered as a record data pattern discernment means to compute record pulse duration and blank length with a counter, in invention according to claim 4 here.
[0013] Under the present circumstances, in invention according to claim 6, the counter which counts record pulse duration, and the counter which counts blank length were formed separately.

[0014] Moreover, it sets to these invention and they are die length L0, L1, and L2 beforehand by invention according to claim 7. It considered as the correction value setting means which consists of a ROM which memorized the correction value of the record pulse according to information.
[0015] They are [a distinction means to distinguish the class of optical recording medium in invention according to claim 8, and] die length L0, L1, and L2 beforehand. It considered as the correction value setting means which consists of a selection means to choose two or more ROMs which memorized the correction value of the record pulse according to information for every class of optical recording medium, and ROM which corresponds according to the distinction result of said distinction means.
[0016] Die length L0, L1, and L2 suitable for the class of optical recording medium distinguished from a distinction means to distinguish the class of optical recording medium, in invention according to claim 9 It considered as the correction value setting means which consists of RAM in which the correction value of the record pulse according to information is written, and a write-in control means for this RAM.
[0017] Under the present circumstances, it considers as the optical recording medium which made the appointed field memorize the correction value of the record pulse suitable for that class, and was made to make the correction value of the record pulse read from this appointed field by the write-in control means write in RAM in invention according to claim 10.
[0018] Moreover, in invention according to claim 11, the power up and the record front stirrup of data were made into the write-in control means to which the writing to RAM is made to carry out at the time of the idle state of equipment.
[0019] It carried out as the record pulse amendment means which consists of a delay means delay respectively the pulse which shows the front edge positional information and the back edge positional information of a record data pattern recognized by the record data pattern recognition means in invention according to claim 4 in invention according to claim 12 based on the correction value of the record pulse by the correction-value setting means, and a generation means generate the record pulse in the NRZI code from the pulse train delayed with this delay means.
[0020] Similarly by invention according to claim 13, it sets to invention according to claim 4. A pulse train separation means to separate the pulse which shows the front edge positional information of the record data pattern recognized by the record data pattern recognition means, and the pulse which shows back edge positional information, It considered as the record pulse amendment means which consists of a delay means to delay each separated pulse train respectively based on the correction value of the record pulse by the correction value setting means, and a generation means to generate the record pulse in the NRZI code from each pulse train delayed with this delay means.
[0021] In invention according to claim 14, in invention according to claim 12, whenever the pulse which shows the front edge positional information respectively delayed based on the correction value of a record pulse, and the pulse which shows back edge positional information were inputted, it considered as the generation means which consists of a toggle mold flip-flop which repeats toggle actuation and generates the record pulse in the NRZI code.
[0022] After generating the NRZI code which amended only the pulse train which indicates back edge positional information to be the ** generation means before generating the NRZI code which amended only the pulse train which shows front edge positional information in invention according to claim 13, in invention according to claim 15, it considered as the generation means which consists of the AND gate which considers the output of the ** generation means, and the generation means for before these and the generation means for after as an input.
[0023]
[Function] The record pulse duration L0 for [which it is going to write in in invention of claim 1 and four publications after this in case mark edge record is performed] writing, The previous blank length L1 And record pulse duration L2 in front of one Since it responds and the pulse width and output timing of a record pulse for writing were amended It becomes amendment not only in consideration of the effect of the previous blank length but the effect of the remaining heat about the record mark before one, and control of the edge location of a record mark is performed correctly.
[0024] In invention according to claim 2, since it was made to amend as correction value of a record pulse also about the die length to which the power of the standup section of a record pulse and its power other than the pulse width of a record pulse and output timing are changed, not only the edge position control but control of a mark configuration is correctly performed about a record mark.
[0025] In invention according to claim 3, it becomes amendment not only in consideration of the previous blank length and record pulse duration but the effect of the remaining heat accumulated around the optical recording medium since the blank length and record pulse duration who precede further were taken into consideration and amended, and the edge location of a record mark is controlled more by accuracy.
[0026] In invention according to claim 5, since the counter constituted the record data pattern discernment means, certainly required record pulse duration and blank length can be computed by making it an easy configuration.
[0027] In invention according to claim 6, since record pulse duration and blank length were computed with the separate counter, it becomes a thing suitable for high-speed record.
[0028] Since ROM which memorized correction value beforehand constituted the correction value setting means according to invention according to claim 7, the correction value over a record mark can be set up very easily.
[0029] In invention according to claim 8, since two or more ROMs are prepared as a correction value setting means and ROM was chosen according to the class of optical recording medium, when correction value changes with classes of optical recording medium, it can be coped with proper.
[0030] In invention according to claim 9, since a correction value setting means is considered as a RAM configuration and the correction value of a record pulse was written in according to the class of optical recording medium, even if it is the case where correction value changes with classes of optical recording medium, it can be coped with proper.
[0031] Under the present circumstances, in invention according to claim 10, since the correction value which was suitable for that medium in the appointed field of an optical recording medium is made to memorize, this is read and it was made to write in RAM, amendment of the record pulse which made it small memory space and was suitable for each optical recording medium is attained, and exact control of an edge location is attained.
[0032] Furthermore, in invention according to claim 11, since it was made to write in correction value to such RAM to timing, such as a power up, it can process, without barring original record/playback actuation etc.
[0033] In invention according to claim 12, since the record pulse of the NRZI code was generated from the pulse train which the pulse which shows the front edge positional information of the recognized record data pattern and back edge positional information was respectively delayed according to correction value, and was delayed, it can simplify extremely and the record pulse based on correction

value can be acquired.
[0034] In invention according to claim 13, since a separation means separates the pulse which shows such front edge positional information of a record data pattern, and back edge positional information and the record pulse of the NRZI code was respectively generated through delay processing, it can respond also to high-speed record.
[0035] In invention according to claim 14, since the toggle mold flip-flop constituted the generation means of such a record pulse, it becomes generable [the record pulse based on correction value] very simply.
[0036] In invention according to claim 15, since the NRZI code which amended only the pulse which shows front edge positional information, and the NRZI code which amended only the pulse which shows back edge positional information were generated separately, both AND is taken and the record pulse was generated, it can respond also to high-speed operation.
[0037]
[Example] The first example of this invention is explained based on drawing 1 thru/or drawing 3 . According to a record data pattern, this example controls a mark configuration by amending the pulse width of a record pulse, output timing, and the die length to which the power at the time of a record pulse standup and this record power are changed further with high precision to the edge location of a record mark, and a pan, and explains that amendment approach by drawing 1 by it.
[0038] First, in case data are written in by the mark edge record approach, when it used as it is and having been recorded, without amending this, as it cconverted data with the NRZI code (Non Return to Zero Inverted code), and it mentioned above, a record mark will be written in for a long time than an ideal condition (shown also in the upper part in drawing 1 as an actual record mark). So, such a record pulse is amended according to a record data pattern, and it controls by this example so that the edge location of a record mark comes to the location of an ideal. The pulse duration of the record pulse for writing which it is going to write in from now on For example, L0, He is the record pulse duration in front of L1 and one about the blank length in front of this record pulse L2 When it carries out, Such die length L0, L1, and L2 Such die length L0, L1, and L2 computed and computed It responds, the pulse width and output timing of a record pulse for writing are amended, and the edge location of a record mark is controlled.
[0039] Such an amendment approach is attained by the configuration as shown in drawing 2 . It is constituted by the record data pattern discernment means 1, the correction value setting means 2, and the record pulse amendment means 3 if it divides roughly. First, as a premise, it becomes irregular with a modulator (not shown) and let the input data sent from the controller (not shown) be modulation data. As this modulation technique, what kind of method may be used, for example, (2 7) it is a RLL sign (Run Length Limited sign). There is a RLL (1 7) sign etc. Here, in this example, the NRZI code is not outputted as it is from a modulator, but it outputs as modulation data of the NRZI code, and amendment according to the data pattern of modulation data is performed here by considering this as an input, and the record pulse of the NRZI code is outputted.
[0040] Each die length L0, L1, and L2 which such modulation data were inputted into the record data pattern discernment means 1, and was mentioned above It is computed. Each computed die length L0, L1, and L2 Data are inputted into the correction value setting means 2, and the pulse width of the record pulse according to the record data pattern based on these data and the correction value of output timing are set up. For example, the output timing of the front edge of a record pulse and the output timing of a back edge are set up, and pulse width is determined from such two timing. Based on such correction value, with the record pulse amendment means 3, a record pulse is amended, the amended record pulse information is sent out to a laser drive circuit (not shown), semiconductor laser (not shown) is blinked, and a record mark is formed in an optical recording medium.
[0041] Such a configuration and an operation are explained more to a detail. First, the record data pattern discernment means 1 considers modulation data as an input, and is the pulse duration L0 of the record pulse for writing, and the blank length L1 in front of this record pulse as that pattern data. And record pulse duration L2 in front of one It asks. Here, based on modulation data, the sequential count of record pulse duration and the blank length is carried out with the counter 4, and the counted value is respectively held to registers 5, 6, and 7. A register 5 is the pulse duration L0 of the record pulse for writing. A ** and a register 6 are the previous blank length L1. A ** and a register 7 are the record pulse duration L2 in front of one. It is a **. Such die length L0, L1, and L2 When data come out fully, it outputs to the correction value setting means 2. In addition, not only the data of such die length L0, L1, and L2 but the thing constituted so that it may ask for the data of one or more blank length who precedes further, or record pulse duration is easy.
[0042] Subsequently, the correction value setting means 2 of this example is constituted by ROM8. Namely, die length L0, L1, and L2 computed with the record data pattern discernment means 1 Data are considered as the address input of ROM8, and they are die length L0, L1, and L2 to this ROM8. The optimum value of the correction value of the record pulse according to data is made to memorize beforehand, and it constitutes so that the output of this ROM8 may be used as amendment data of the record pulse for writing. What is necessary is just to make the output timing of the front edge of a record pulse, the output timing of a back edge, etc. memorize as such amendment data. Incidentally, pulse width is determined by such two output timing. Furthermore, a mark configuration can also be amended if ROM8 is made to memorize by using as amendment data correction value of the power of the standup section of a record pulse, and die length to which the power is changed in addition to such pulse width and output timing.
[0043] The record pulse amendment means 3 amends a record pulse based on the correction value outputted from the correction value setting means 2, column connection of the toggle mold flip-flop 11 used as the delay element 9 and selector 10 used as a delay means, and a generation means is made, it is constituted, and selection actuation of a selector 10 is controlled by this example by the output of said ROM8. First, if the back edge pulse which determines the front edge pulse which opts for the standup of a record pulse, and falling is located in a line with modulation data by turns and this is inputted into the toggle mold flip-flop 11 as shown in drawing 3 , it will be changed into the NRZI code and the output will serve as a record pulse. Then, while using the amendment data obtained by ROM8 of the correction value setting means 2 as a select signal, delay each pulse by said delay element 9, it is made to input into a selector 10, and one of them is chosen. Since a component which advances a pulse in fact incidentally does not exist although it is necessary to advance a back edge pulse when shortening record pulse width, he is trying to delay an order edge pulse respectively here because only predetermined time amount receives modulation data in front. If the pulse train respectively delayed based on this amendment data is made to input into the toggle mold flip-flop 11, the output Q of this toggle mold flip-flop 11 will serve as a record pulse amended according to the record data pattern.
[0044] It continues and the second example of this invention is explained based on drawing 4 . The same part as the part shown in said example is shown using the same sign (suppose that it is the same also in the following examples). This example is equivalent to invention according to claim 6, replaces with a counter 4 about the record data pattern recognition means 1, forms two counters 12 and 13, and a counter 12 is made only into for record pulse duration, and it makes a counter 13 only for blank length. For this reason, to a counter 12, the

enable signal only at the time of record pulse duration calculation is given, and the enable signal only at the time of blank length calculation is given to a counter 13. Thus, by dividing and computing by record pulse duration and blank length, it can respond to high-speed record.
[0045] Moreover, drawing 5 and drawing 6 explain the third example of this invention. This example is equivalent to invention according to claim 13. With the record pulse amendment means 14 of this example, the demultiplexer 15 as a pulse train separation means to separate into the back edge pulse which determines the front edge pulse which opts for the standup of a record pulse about the inputted modulation data first, and falling is formed. While the delay element 16 and selector 17 used as the delay means for front edge pulses are prepared in the latter part of this demultiplexer 15, the delay element 18 and selector 19 used as the delay means for back edge pulses are prepared. To a selector 17, the front edge pulse lag data select signal in the amendment data from the correction value setting means 2 is given, and it considers as the configuration as which one of the front edge pulses delayed by the delay element 16 is chosen by the selector 17. Similarly, to a selector 19, the back edge pulse lag data select signal in the amendment data from the correction value setting means 2 is given, and it considers as the configuration as which one of the back edge pulses delayed by the delay element 18 is chosen by the selector 19. The SR flip-flop 20 as a generation means which makes the output of said selector 17 a set signal, and makes the output of said selector 19 a reset signal is formed. Therefore, the output Q of this SR flip-flop 20 serves as a record pulse amended according to the record data pattern, as shown in drawing 6 .
[0046] Since according to this example it separates into a front edge pulse and a back edge pulse and was made to perform delay processing and generation processing of the record pulse of the NRZI code, high-speed record can be coped with.
[0047] Moreover, drawing 7 explains the fourth example of this invention. This example is equivalent to invention according to claim 15, and is made to transform said example. Namely, while a flip-flop generates the NRZI code which amended only the front edge location from the front edge pulse delayed based on amendment data From the back edge pulse delayed based on amendment data, a flip-flop generates the NRZI code which amended only the back edge location. By making these two NRZI codes input into the AND gate (not shown), and taking AND, the record pulse amended according to the record data pattern as an AND-gate output is acquired. As well as said example when based on this example, high-speed record can be coped with.
[0048] Furthermore, drawing 8 explains the fifth example of this invention. This example is equivalent to invention according to claim 8, and is related with a correction value setting means 21 by which the case where the optimum value of correction value changed with classes (an optical disk, magneto-optic disk, etc.) of optical recording medium was assumed. That is, it replaces with the correction value setting means 2 constituted by one ROM8 shown in drawing 2 , and correction value setting means 21 of this example are consisted of by two or more ROM 22a, 22b-22n which made the optimal correction value memorize for every class of optical recording medium, and the selector 23 as a selection means to choose one from these ROMs 22a and 22b - 22n. This selector 23 performs selection actuation with the select signal from CPU (not shown) as a distinction means to distinguish the class of optical recording medium.
[0049] Therefore, what is necessary is to distinguish the class and just to change the correction value used by choosing one of ROMs 22a and 22b - the 22n according to the class, when the optimum value of correction value changes with classes of optical recording medium. As a class distinction method of an optical recording medium, the data in which the class of the medium is shown are beforehand recorded on the appointed field of an optical recording medium, for example, and the class information on an optical recording medium is read here at the time of the idle of a power up, a data-logging front, or drive equipment, or you may make it make class information input by the switch actuation by the user. as the appointed field of an optical recording medium -- SFP (Standard Formated Part) etc. -- it is used. According to this example, also when correction value changes with classes of optical recording medium, it can be coped with proper.
[0050] It continues and drawing 9 explains the sixth example of this invention. This example is equivalent to invention according to claim 9, and constitutes a correction value setting means by RAM. In this case, a distinction means to distinguish the class of optical recording medium as well as said example is established. And according to the distinction result, the correction value of the record pulse suitable for the optical recording medium of the class beforehand distinguished by RAM considering CPU as a write-in control means is written in before a power up or data logging. The rest is the die length L0, L1, and L2 computed by the record data pattern discernment means 1 like the case where ROM is used. What is necessary is to consider information as the address input of RAM and just to set up this RAM output as correction value of a record pulse. Drawing 9 is a flow chart which shows the write-in processing of correction value to RAM.
[0051] Therefore, according to this example, even if it is the case where amendment changes with classes of optical recording medium, it can respond by making it memory space only with only using [little] one RAM.
[0052] Furthermore, drawing 10 explains the seventh example of this invention. This example is equivalent to invention according to claim 10, and like said example, it is made to perform the writing of correction value to this RAM using an optical recording medium while it constitutes a correction value setting means by RAM. That is, the correction value suitable for that optical recording medium itself is beforehand recorded on the appointed fields (SFP mentioned above) of an optical recording medium, the correction value data currently recorded by this appointed field before a power up or data logging are written in read in, and this correction value data is written in RAM. Drawing 10 is a flow chart which shows write-in processing of the correction value data to such RAM. What is necessary is just to process the rest like said example.
[0053] Also when based on this example, even if it is the case where amendment changes with classes of optical recording medium, it is not necessary to memorize the correction value for every various kinds by the controller side by which it can respond upwards by making it memory space only with only using [little] one RAM, and CPU is carried, and the memory space in a controller as well as said example can be reduced.
[0054] In addition, in the example using such RAM, the writing of correction value data to RAM does not bar many original actuation, such as record/playback of drive equipment, by making it carry out at the time of the idle state of drive equipment else [in front of the power up mentioned above and data logging].
[0055]
[Effect of the Invention] The record pulse duration L0 for [which it is going to write in after this in case mark edge record is performed according to invention of claim 1 and four publications] writing, The previous blank length L1 And record pulse duration L2 in front of one Since it responds and the pulse width and output timing of a record pulse for writing were amended It can consider as amendment not only in consideration of the effect of the previous blank length but the effect of the remaining heat about the record mark before one, and the edge location of a record mark can be controlled correctly.
[0056] Since it was made to amend as correction value of a record pulse also about the die length to which the power of the standup section of a record pulse and its power other than the pulse width of a record pulse and output timing are changed according to invention according to claim 2, not only the edge position control but control of a mark configuration can be correctly performed about a record mark.

[0057] According to invention according to claim 3, it can consider as amendment not only in consideration of the previous blank length and record pulse duration but the effect of the remaining heat accumulated around the optical recording medium since it was made to amend in consideration of the blank length and record pulse duration who precede further, and the edge location of a record mark can be controlled more correctly.
[0058] According to invention according to claim 5, since the counter constituted the record data pattern discernment means, certainly required record pulse duration and blank length can be computed by the ability to make it an easy configuration.
[0059] According to invention according to claim 6, since record pulse duration and blank length were computed with the separate counter, it should be suitable for high-speed record.
[0060] Since ROM which memorized correction value beforehand constituted the correction value setting means according to invention according to claim 7, the correction value over a record mark can be set up very easily.
[0061] Since according to invention according to claim 8 two or more ROMs are prepared as a correction value setting means and ROM was chosen according to the class of optical recording medium, also when correction value changes with classes of optical recording medium, it can be coped with proper.
[0062] Since according to invention according to claim 9 a correction value setting means is considered as a RAM configuration and the correction value of a record pulse was written in according to the class of optical recording medium, it is made the configuration using one RAM, and even if it is the case where correction value changes with classes of optical recording medium, it can be coped with proper.
[0063] Under the present circumstances, since the appointed field of an optical recording medium is made to memorize the correction value suitable for that medium, this is read and it was made to write in RAM according to invention according to claim 10, the record pulse which made it still smaller memory space and was suitable for each optical recording medium can be amended, and exact control of an edge location is attained.
[0064] Furthermore, according to invention according to claim 11, since it was made to write in correction value to such RAM to timing, such as a power up, it can process, without barring original record/playback actuation etc.
[0065] Since the record pulse of the NRZI code was generated from the pulse train which the pulse which shows the front edge positional information of the recognized record data pattern and back edge positional information was respectively delayed according to correction value, and was delayed according to invention according to claim 12, it can simplify extremely and the record pulse based on correction value can be acquired.
[0066] Since according to invention according to claim 13 a separation means separates the pulse which shows such front edge positional information of a record data pattern, and back edge positional information and the record pulse of the NRZI code was respectively generated through delay processing, it can respond also to high-speed record.
[0067] According to invention according to claim 14, since the toggle mold flip-flop constituted the generation means of such a record pulse, the record pulse based on correction value can be generated very easily.
[0068] Since according to invention according to claim 15 the NRZI code which amended only the pulse which shows front edge positional information, and the NRZI code which amended only the pulse which shows back edge positional information were generated separately, both AND is taken and the record pulse was generated, it can respond also to high-speed operation.

[Translation done.]